Energy Conservation at Rock Island Arsenal

20 JAN 2006

Mr. David Osborn
Rock Island Garrison

Our Mission ***- provide equitable, effective, and efficient management of Army installations worldwide to support mission readiness and execution, enable the well-being of Soldiers, civilians, and family members, improve the Army's aging infrastructure and preserve our environment.***

Leading Change for Installation Excellence

PURPOSE of PRESENTATON:

I. Introduction to the Arsenal

II. RIA Energy Program - Progress

III. Industrial Optimization Projects

IV. Energy Optimization – RIA's Future

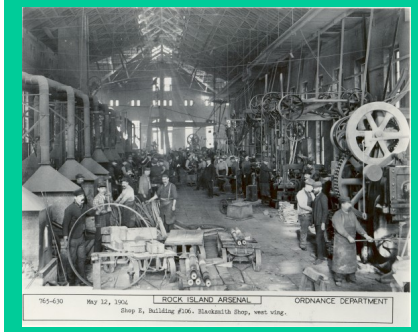
Rock Island Arsenal – Introduction

Rock Island Arsenal – Introduction

Geographics & History

- 946-acre island in the Mississippi River ~ 160 miles west of Chicago
- Began as Army Fort in 1812
- Became Arsenal just after Civil War
- Now one of largest most-modern arsenals in the world

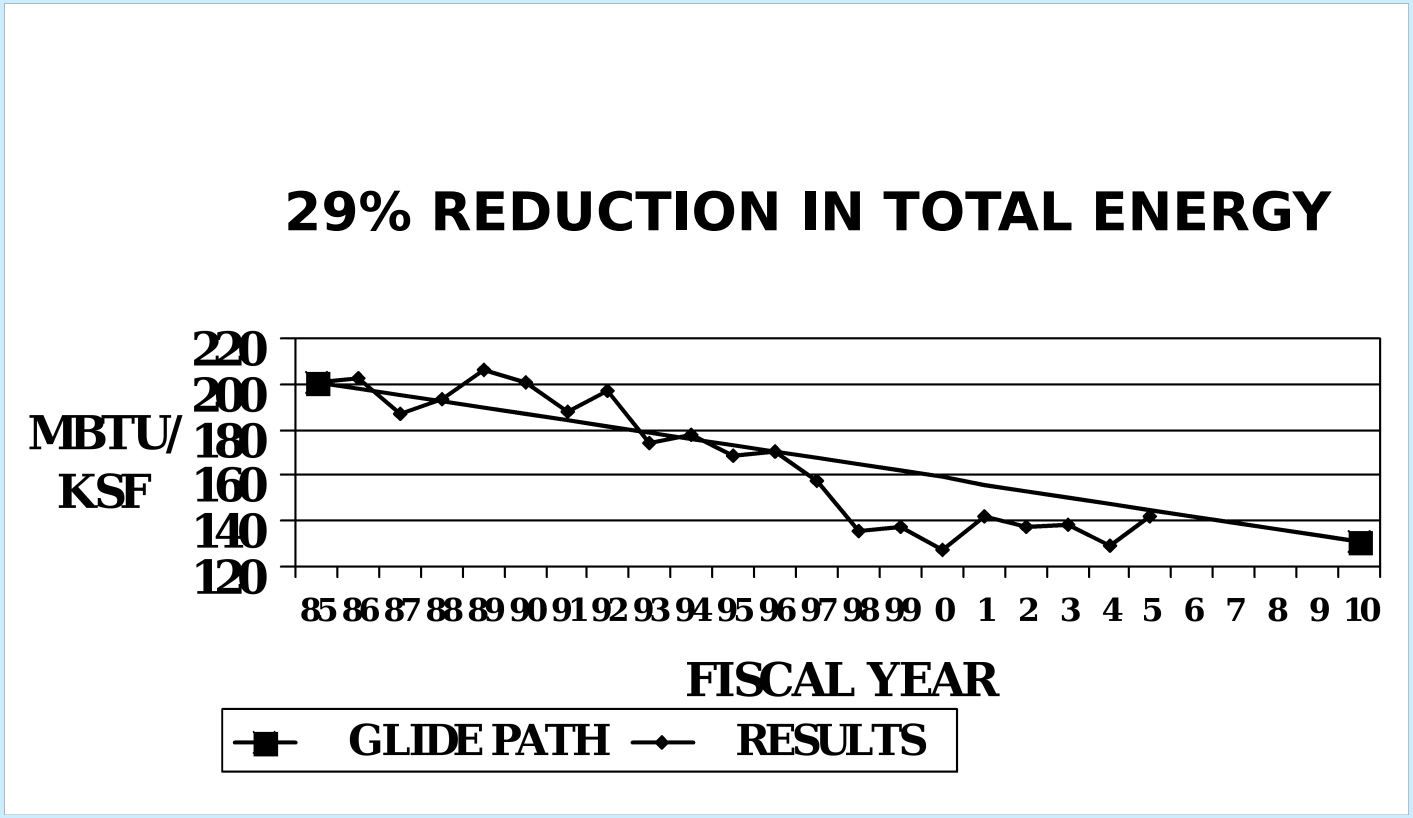
RIA HISTORY



RIA Industrial Quadrant

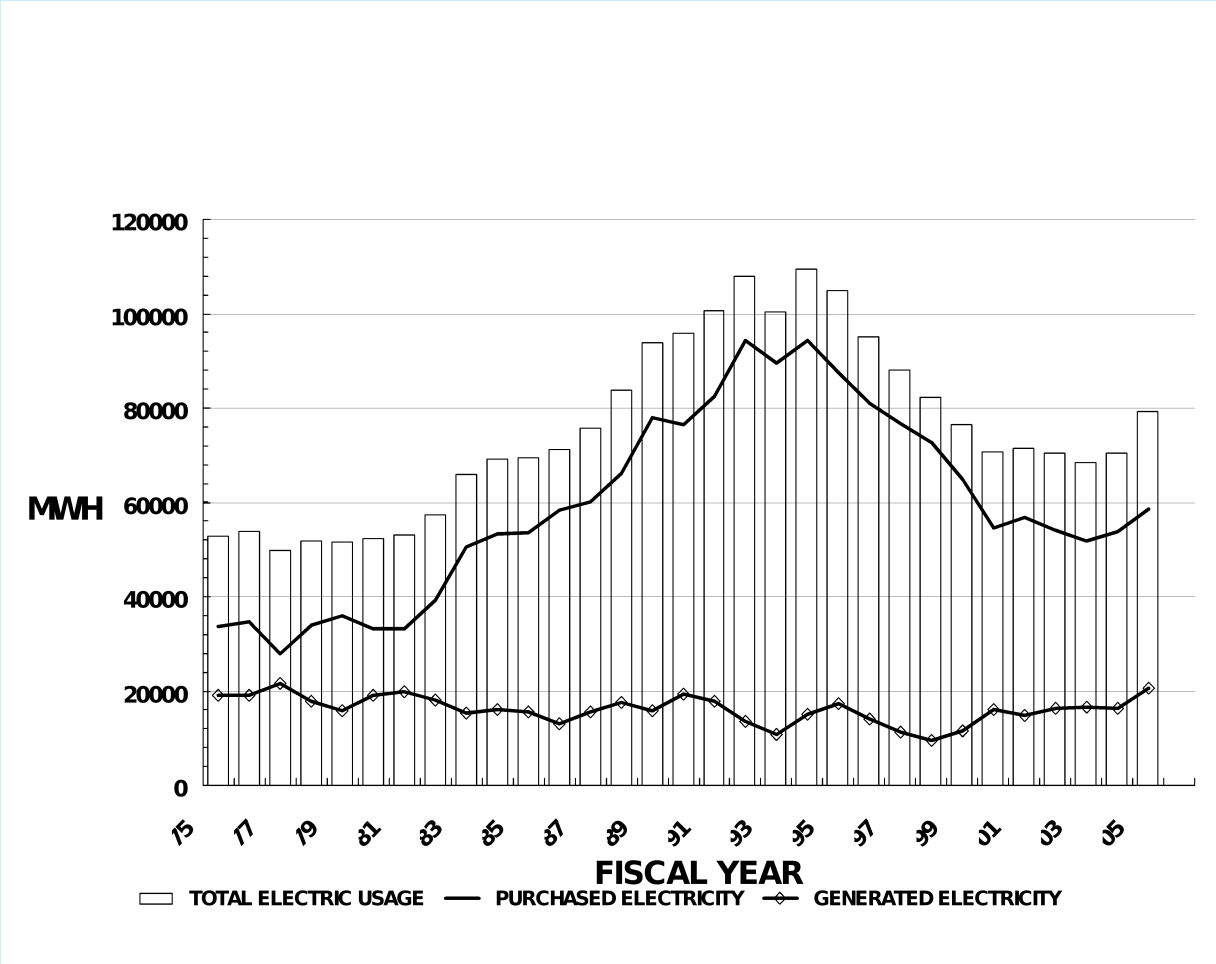
- 187 Arsenal Buildings (total)
- 6.58 Million Square Feet
  - Approx. 2.5 Million sq. ft. Industrial
  - Approx. 2.5 Million sq. ft. Admin & General Facility
  - Approx. 1.6 Million sq. ft. Warehouse & other

RIA ENERGY PROGRAM GLIDEPATH PROGRESS

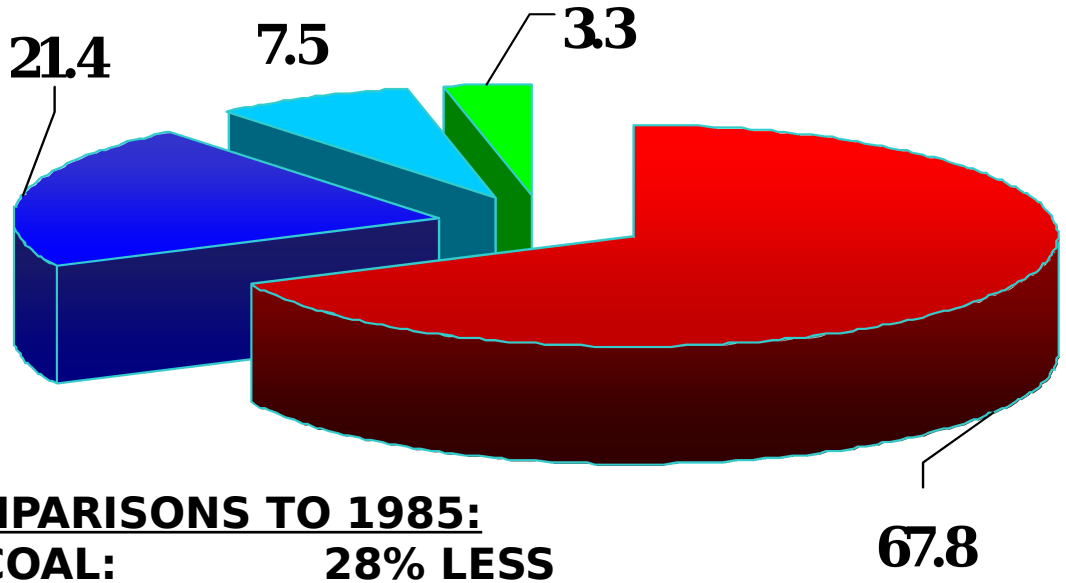


We have been at or below the energy glide-p for over a decade

RIA ENERGY PROGRAM
FY 2005 ELECTRIC TREND



Arsenal 2005 Energy Breakout



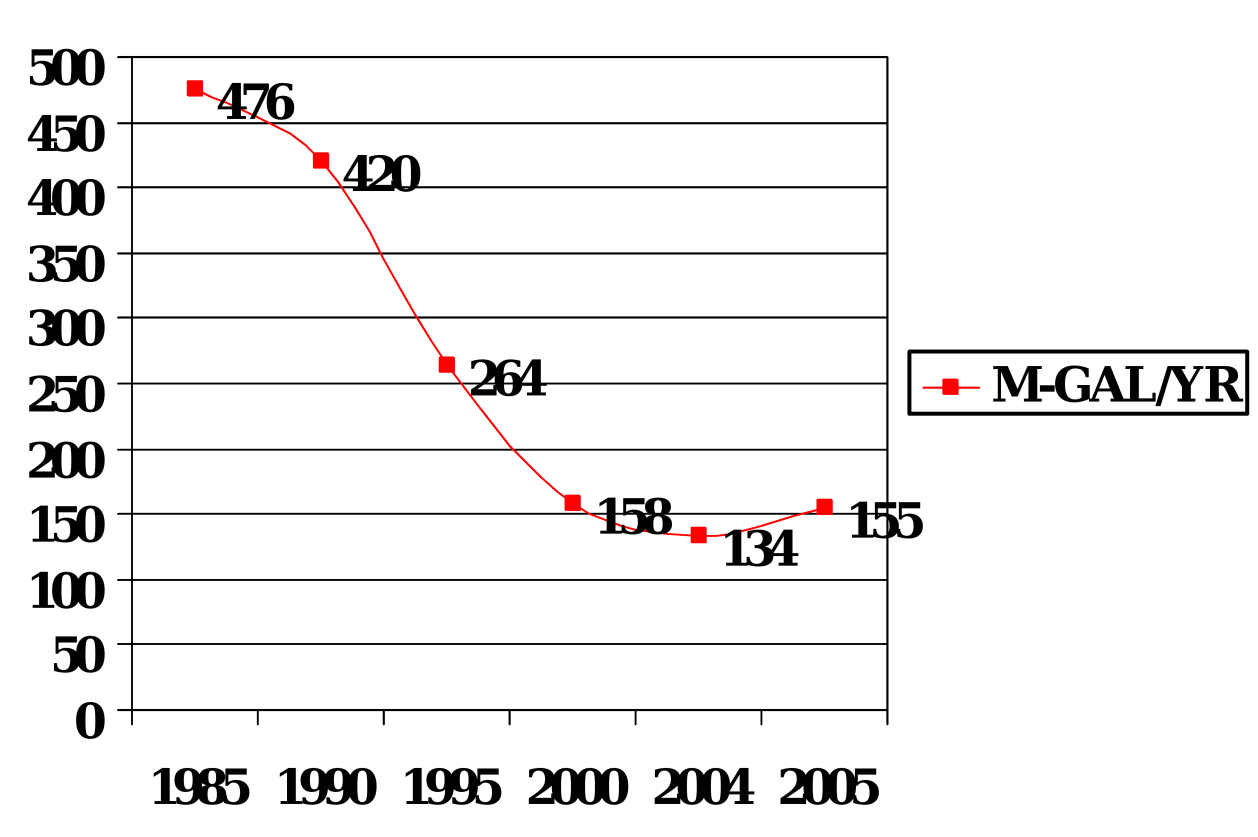
COMPARISONS TO 1985:

COAL: 28% LESS

ELECTRIC: 14.2% MORE

NATL GAS: 14.5% LESS

FY 2005 Water Consumption Trend
A 67% Reduction



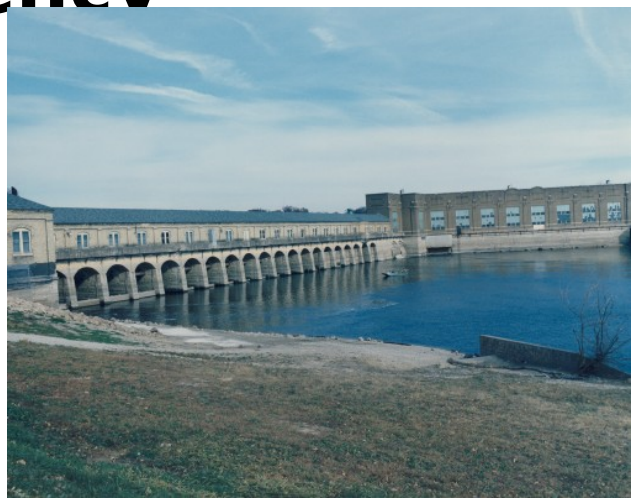
Use of Renewable Electrical Energy

- **DOD Goals:**
  - 3% by 2007 – 2009
  - 5% by 2010 – 2012
  - 7.5% by 2013
- **Arsenal Renewable Electricity Use is currently at 32.6 % of FY 2005**
  - 8 Main Generators (625 hp) each
  - 2 Smaller Generators (250 hp) each
  - 3.0 mega-Watt average plant output @ 10.5' head
  - 26,100 MWH/year annual generation expected
  - 9% from Utility Company (wind, hydro, etc)

Objectives: Reduce Load or Need

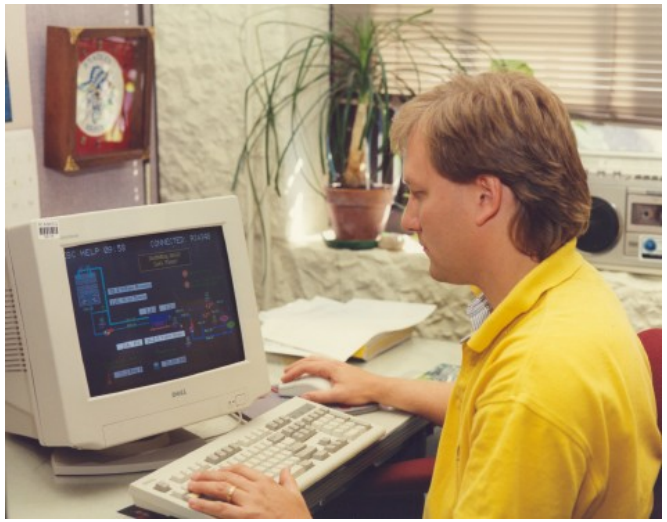
- Consolidate Building Space
- Construct Energy Efficient Envelopes
- Reduce Overheating and Overcooling
- Eliminate Leaks
  - Especially Steam, Air, & Water

Objectives: Improve Operating Efficiency



- Improve Heat Plant Efficiency
- Renovate Hydro-electric Plant
- Install High Efficiency Lighting
- Recommission HVAC Systems
- Install High Efficiency Chillers
- Install High Efficiency Motors and VFD’s

Objectives: Improve Operating Efficiency



- Expand DDC Controls and Maintain Night Setbacks
- Operate Lighting Only When Needed
- Use Occupancy Sensors
- Shut Off Personal Computers at Night

Completed Arsenal Energy Projects - General Facility

Funded/Completed Energy Projects

	YEAR	PROJECT COST	SAVINGS/YR
• NAT. GAS TO V AREA	94	$ 170K (FEMP)	$ 30K
• EXPAND EMCS SYST.	94	$ 180K (FEMP)	$150K
• WAREHOUSE LIGHTS	94	$ 300K (FEMP)	$ 90K
• EXIT SIGN LAMPS	94	$ 15K (FEMP)	$ 7K
• HYDROPLANT MOD	95	$3,000K (ECIP)	$500K
• HYDRO TURBINES (4)	95	$2,500K (FEMP)	$500K
• N. GAS TO PVG GNDS	95	$ 277K (FEMP)	$ 35K
• LIGHTING, BLDG 350	95	$ 820K (ECIP)	$150K

Funded/Completed Energy Projects

	YEAR	PROJECT COST	SAVINGS/YR
• TEMP. CONTROLS	95	$ 458K (FEMP)	$ 90K
• HYDRO TURBINES (4)	97	$2,500K (ECIP)	$500K
• REPAIR STEAM TRAPS	97	$ 712K (FEMP)	$300K
• REPLACE CHILLERS	2005	$5,500K (ECIP)	$825K
• TOTALS		$17,210K	$3,167K

Lighting Project Statistics

	COST	#FIXTURES	OLD KW	NEW KW
BLDG 299	$300k	1,100	459	145
BLDG 350	$820k	5,000	800	334
BLDG 220	$864k	3,100	891	273
ESPC - LITES	$5,106	25,185	4,078	1,904
TOTALS	$7,090k	34,385	6,228	2,656

TOTAL REDUCTION: 3,572 KW

Doesn't include Arsenal Funded Projects
- Bldgs 60, 62, 68, 131, 390

5 ESPC PROJECTS (PR 1999-3066)

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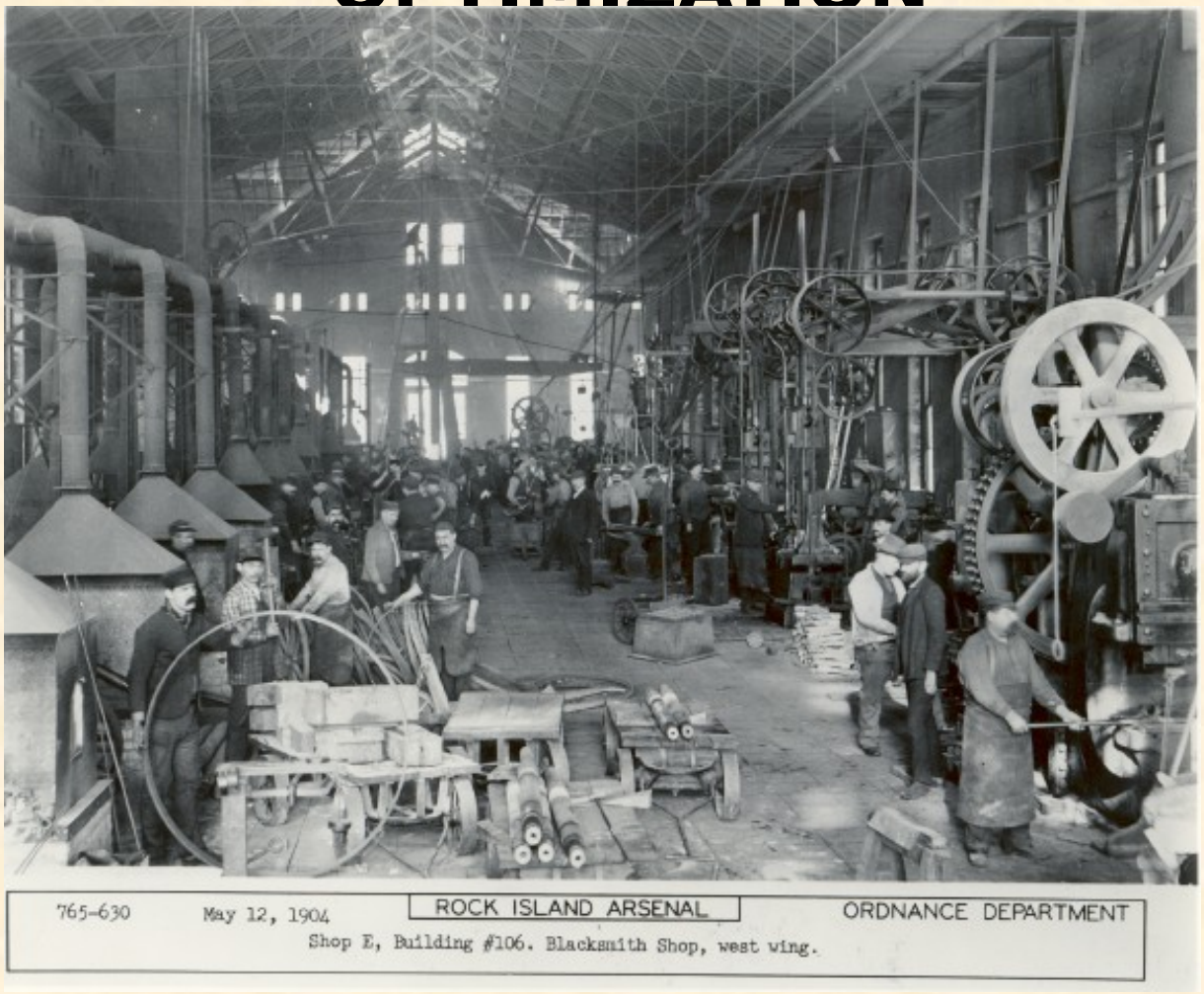
- **GEOTHERMAL IN HOUSING** (PR 2002-6206)
- **LIGHTING CONVERSIONS** (PR 2002-6207)
- **HVAC CONTROLS** (PR 2002-6208)
- **HYDRO-ELECTRIC TURBINES** (PR 2002-6209)
- **PEAK GENERATOR** (PR 2002-6210)

ESPC Cost & Savings Summary

ITEM	IMPLEMENT COST ($k)	ANNUAL SAVINGS ($K)
GEOTHERMAL	$ 291	$ 17.4
LIGHTING	$ 4,225	$ 402.2
HVAC CONTROLS	$ 345	$ 86.5
HYDRO-ELECTRIC	$ 2,347	$ 155.1
PEAK SHAVER	$ 896	$ 27.1
TOTALS:	$ 8,105	$ 688.2

INDUSTRIAL ENERGY OPTIMIZATION



INDUSTRIAL ENERGY OPTIMIZATION

- Review of Past Industrial Projects
- Quick Tour of Industrial Complex
- Status of Current Industrial Optimization Study

Past Industrial Projects

- **REARM – MAJOR INDUSTRIAL RENOVATION COMPLETED IN 1990'S**
  - **BUILDING CONSOLIDATION**
  - **HEATING PLANT RENOVATION**
  - **AUTOMATED STORAGE**
  - **STATE OF ART MFG TECHNOLOGIES**
  - **ENERGY EFFICIENT STRUCTURES**
  - **LESS USE OF MOBILITY FUELS**

Past Industrial Projects

- **OTHER COMPLETED INDUSTRIAL PROJECTS:**
  - **SHORT CYCLE HEAT TREAT STUDY**
  - **ENERGY EFFICIENT MOTORS EMPHASIZED IN MAINTENANCE**
  - **CONVERSION OF FORGES FROM STEAM TO PNUEMATIC DRIVES**
  - **HIGH SPEED OVERHEAD DOORS INSTALLED WHERE PRACTICAL**
  - **ENERGY EFFICIENT LIGHTING**

Manufacturing Renovation Early 1990's

WELDING

FOUNDRY

FORGING

MACHINING

CASTINGS

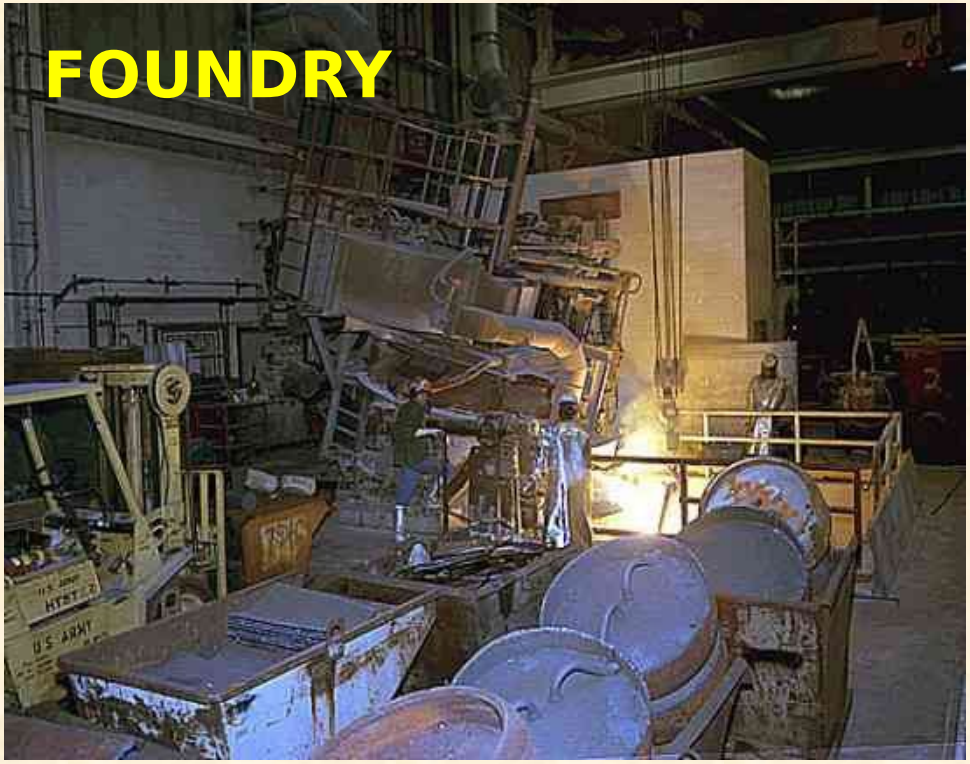
SIMULATION INSPECTION

LARGE ASSEMBLY

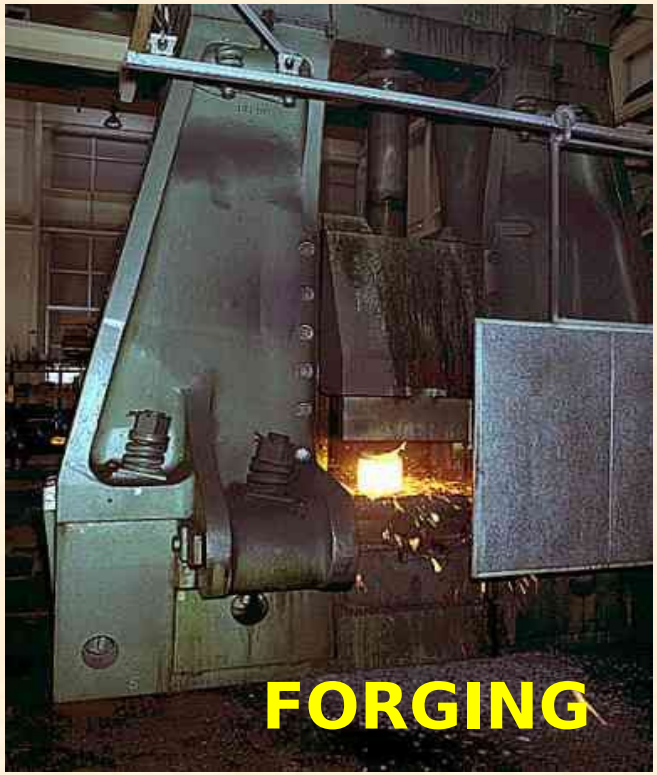
ASSEMBLY CLIMATE CONTROLLED

Rock Island Arsenal Kingsbury Manufacturing Complex

Energy Improvements in Manufacturing



Electric Furnaces provide better control and use less energy than gas furnaces



The forges were converted from steam to pnuematic drives

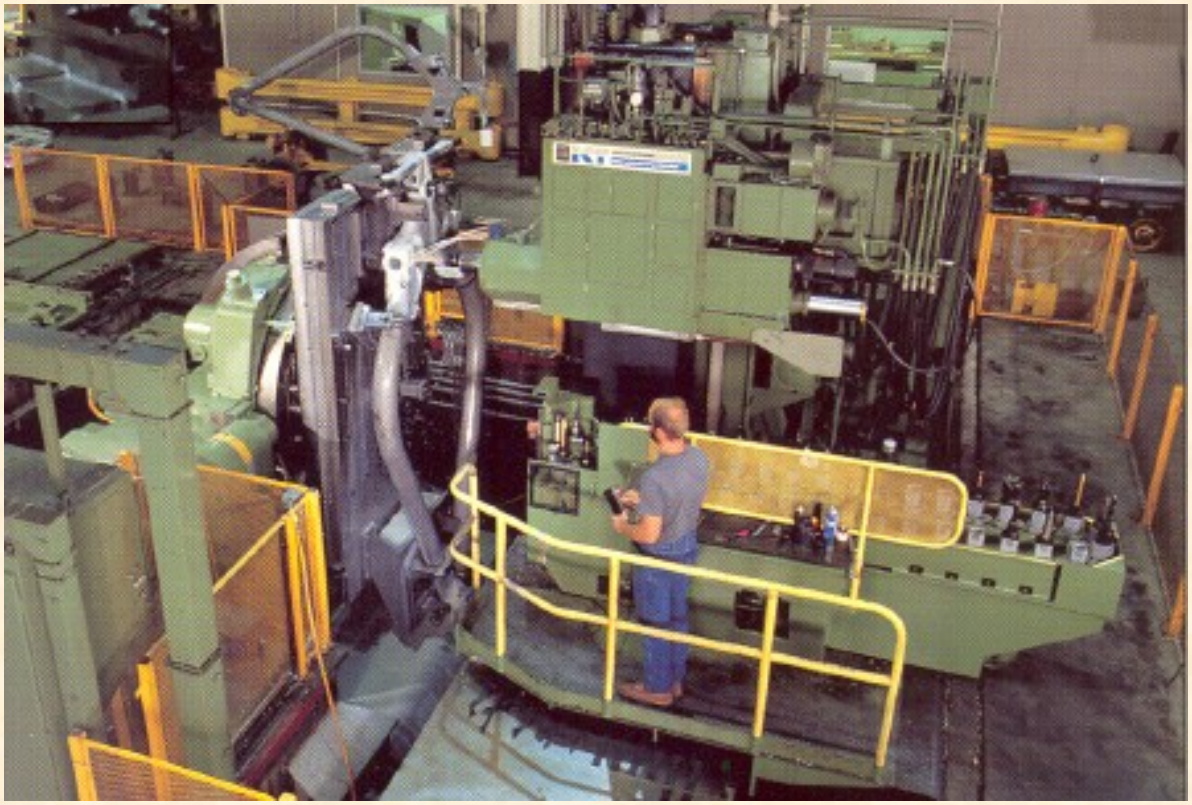
Energy Improvements in Manufacturing

A state-of-art welding center was established

Energy Improvements in Manufacturing

4-Axis Machining Centers - Save energy through work space consolidation

Energy Improvements in Manufacturing



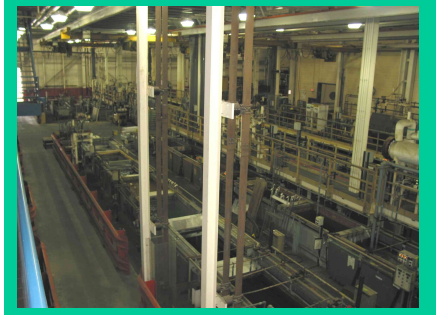
7-Axis Machining Centers - We have one of the most capable machining centers in the world

Industrial Showcase Initiative
(Arsenal)

Progress at Rock Island Arsenal:

- Established partnership with CERL and various industry experts in FY 2004-FY 2005
- Completed industrial study – "*Process and Energy Optimization Assessment Level II Analysis*"

RIA JMTC

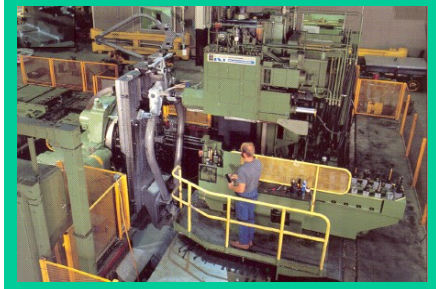


Industrial Showcase Initiative
(Arsenal)

RIA Progress (cont):

- Developed FY 2007 Energy Conservation Investment Program (ECIP) project ($x.xm)
- Follow-up projects are planned but future funding support may depend on success of this initial project

RIA JMTC



POTENTIAL INDUSTRIAL PROJECTS – SHOWCASE PRIORITIES

- Manufacturing Ventilation
  - Plating Shop Tanks
  - Machinery Mist Containment
  - Heat Treat Fume Evacuation
- Paint Boot Containment and Low-Temp Heat Recovery
- Building Envelope Improvements
- Efficient Space Utilization
- Water Conservation

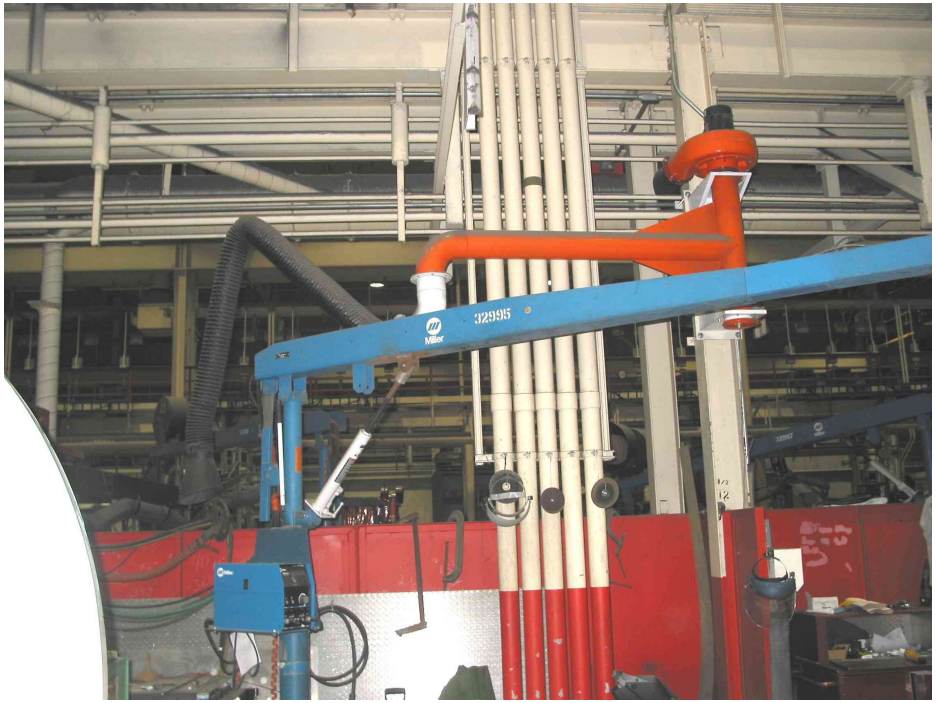
INDUSTRIAL OPPORTUNITIES
KEY MEASURE #1

- Cover Plating Shop Tanks
  - Mist Containment
  - Minimize Water Treatment

INDUSTRIAL OPPORTUNITIES KEY MEASURE #2

- Paint Booth Containment and Low-Temp Heat Recovery

INDUSTRIAL OPPORTUNITIES KEY MEASURE #3



- Ventilation Improvements for Welding and Machinery

INDUSTRIAL OPPORTUNITIES KEY MEASURE #4

- Building Envelope Improvements

Future Energy Initiatives
Goal: Increase Energy Security

- Assess Central Heating Plant – Determine Best Long Range Alternative
  - Modernize?
  - New “Clean Coal” Plant?
  - Other? (Like Geothermal)
- Insulate Building Envelopes
- Increase Renewable Use

END OF BRIEF

NSTALLATION MANAGEMENT AGENC

"Sustain, Support, Defend"